

09/99/352
ASW
DEC 17, 2009

Material Distributor

Inventors: Roger A. Wilson

Background of the Invention

Field of the Invention

This invention relates to a material distributing device, which uses a conveyor to remove material from the top of a load of material in the hopper of a trailer.

Description of the Related Art

Hauling material in a hopper to an area and then spreading the material evenly while unloading the hopper is a problem for farmers, gardeners and others. Unloading the hopper can be accomplished by dropping the material out of the bottom of the hopper which tends to unload the hopper faster at the beginning of the unloading process than toward the end of the unloading process. Sometimes the load will not be removed from the aperture in the bottom of the hopper due to jams caused by clumps of material.

Augers, conveyors or other unloading devices to aid in removing the material from the hopper and to measure the unloading evenly at the bottom of the load have a large power requirements to move the material under the weight of the load in the hopper.

Another method is to unload the hopper by expelling the material out of the back of the trailer such as by opening a tail gate and then forcing the material out of the back of the trailer by moving the material on a conveyor or by an elongated apron for forcing

1 the material out of the back of a trailer or truck bed. The force required to move the entire
2 load in this manner is excessive particularly with a full load in the bed of the truck or
3 trailer. This forceful pushing of the material out of the back of a moving truck does not
4 result in the even distribution of the material on the ground.

5 A dump truck is sometimes used to unload a truck bed but results in uneven
6 spreading of the material.

7 8 Summary of the Invention

9 A trailer having a conveyor belt with paddles thereon for removing material from
10 the top of a load in a hopper only uses the force necessary to move the top layer of the
11 material and unloads the material at an even pace without interference from the rest of the
12 load.

13 A conveyor belt with the paddles for removing the material can be powered from
14 the drive wheels of the trailer such that the unloading rate is directly related to the speed
15 of the trailer for an even distribution of the material.

16 The conveyor belt can dig deeper into the trailer as the trailer is unloaded by
17 pivoting on one axis. If the trailer has a shape to accommodate the pivoting conveyor the
18 entire contents of the trailer can be removed at an even rate with a low power
19 requirement.

20 21 Objects of the Invention

22 It is an object of the invention to spread material from a hopper at an even rate as
23 the hopper is moved over a given area for depositing the material.

0000514.ORI

1 It is an object of the invention to require a minimum of power for removing the
2 material from the hopper and spreading the material evenly.

3 It is an object of the invention to remove all of the material from the hopper.

4 Other objects, advantages and novel features of the present invention will become
5 apparent from the following detailed description of the invention when considered in
6 conjunction with the accompanying drawing.

7 8 Brief Description of the Drawings

9 Fig. 1 is a side view of the trailer being pulled by a tractor.

10 Fig. 2 is a side view of the trailer.

11 Fig. 3 is a rear view of the trailer.

12 Fig. 4 is a side view of the conveyor assembly.

13 14 Description of the Preferred Embodiments

15 Fig. 1 shows a tractor 10 pulling the material distribution trailer 12 behind it. The
16 material distribution trailer 12 has a hopper 14 for carrying material 15 to be distributed.
17 The trailer 12 in the embodiment shown has a drive wheel 22 with a sprocket 24 attached
18 to it. As the drive wheel 22 turns the sprocket 24 turns at the same rate. The sprocket 24
19 is connected to a sprocket 26, which drives a conveyor belt 18, by chain 28. The
20 conveyor belt 18 unloads the material 15 from the hopper 14 at a rate directly related to
21 the speed of the drive wheel 22.

22 As shown in greater detail in Fig. 2, as the trailer 12 is pulled by the tractor 10 the
23 conveyor 18 starts unloading the material 15 from the hopper 14 while the conveyor

20000514.ORI

1 assembly 70 is in the raised position. As the material 14 is removed from the top of the
2 load in the hopper 14 the conveyor assembly is lowered into the load of material 15 until
3 it reaches a position the bottom of the hopper 14. As shown the hopper 14 has an angled
4 bottom 16, such that the pivoting of the conveyor assembly 70 will move in an arch
5 emptying all the material from the hopper.

6 As shown in Figure 3 the sprocket 24 on the drive wheel 22 is connected to chain
7 28 which drives sprocket 26 on conveyor axel 49 for moving conveyor 18. The sprocket
8 sizes for sprockets 24 and 26 may be changed to change the ratio of the speed of the drive
9 wheel 22 to the speed of the conveyor axel 49 to spread the material 15 at different rates.
10 The sprocket sizes may physically be changed, or a series of gears may be used with a
11 gear shifting device 25, to change the ratio of the speeds of the drive wheel and the
12 conveyor axel. In addition to the ability to change the ratios of the drive wheel 22 to the
13 conveyor axel 49 a clutch 50 may be used to engage or disengage the drive wheel 22
14 from the conveyor axel 49. The conveyor 18 may thus be engaged when the material 14
15 is to be unloaded and not engaged at other times.

16 The conveyor assembly 70 may be lowered into the load by its own weight.
17 Further the torque on the conveyor assembly 70 from engaging the material 15 may help
18 force the conveyor assembly 70 into the material 15. The conveyor assembly 70 may
19 alternatively be raised and lowered into the material 15 by a hydraulic cylinder 30 or
20 equivalent device as best seen in Fig. 2.

21 As best seen in Fig. 3 the material 15 is expelled through slot 60 in the rear of
22 hopper 14 by the paddles 20 attached to conveyor belt 18.

05915142001

1 The conveyor assembly 70 may be of any construction such that the conveyor belt
2 18 is supported to rotate and to remove material 15 from hopper 14. As shown in Fig. 4
3 the conveyor assembly 70 has a front pulley or sprocket 32 on each side of the conveyor
4 belt 18 for engaging the conveyor belt 18, a rear pulley or sprocket 34 on each side of the
5 conveyor belt 18 for engaging the conveyor belt and for being attached to and driven by
6 the conveyor axel 49. In the embodiment shown the conveyor assembly comprises a top
7 frame member 40, a bottom frame member 42, a rear support member 45 and a support
8 brace 47. The conveyor belt 18 has paddles 20 attached for engaging and moving
9 material 15. The conveyor belt 18 may be supported on guide rollers 48 or by other
10 means known to those skilled in the conveyor belt industry. The conveyor belt 18 may be
11 a chain having paddles 20 connected thereto and be driven by sprockets 34 on conveyor
12 axel 49. Sprockets 32 and in the front of the conveyor assembly 70 and roller 31 at the
13 top of the conveyor assembly 70 keep the conveyor belt 18 in place on the conveyor
14 assembly 70. A conveyor belt tightening adjustment mechanism 75 is used when adding
15 or change conveyor belts or to adjust the tension on the conveyor belts 18.

16 In an alternative embodiment the conveyor 18 can be driven by a motor 55, such
17 as an electric or hydraulic motor, or some other power source independent of the drive
18 wheel 22. The power source may be used in conjunction with the clutch 50 or without the
19 clutch 50 to drive the conveyor 18 at the desired rate for distribution of the material 15
20 out of hopper 14.

21 Although the material distributor is shown emptying the contents of a hopper 14 on
22 a trailer 12 the hopper 14 can be on a truck bed or on any means of conveyance including
23 ships, barges, aircraft, or land vehicles.

1 Obviously, many modifications and variations of the present invention are
2 possible in light of the above teachings. It is therefore to be understood that, within the
3 scope of the appended claims, the invention may be practiced otherwise than as
4 specifically described.

5 What is claimed is:

0593352-12001
10021 252550